Investigation Work Plan

Submitted to

MODINE
APPLIED THERMAL INNOVATION™

Modine Manufacturing Company

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Prepared by

CH2MHILL

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Acronyms and Abbreviations

ASTM	American Society for Testing and Materials
BH	borehole
CVOC	chlorinated volatile organic compound
DPT	direct push technology
HASP	health and safety plan
HHRA	human health risk assessment
MDNR	Missouri Department of Natural Resources
Modine	Modine Manufacturing Company
PID	photoionization detector
POTW	publicly owned treatment works
ppm	parts per million
QAPP	quality assurance project plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation and Recovery Act facility investigation
SWMU	solid waste management unit
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1. Introduction

This investigation work plan outlines the objectives, approach, and procedures for conducting a subsurface soil investigation beneath the existing manufacturing building at Modine Manufacturing Company (Modine), 221 Sunset Drive Camdenton, Missouri. A site location map is provided as Figure 1. On behalf of Modine, CH2M HILL will manage the site investigation procedures described in this work plan to address the Missouri Department of Natural Resources (MDNR) letter dated June 26, 2007, and discussions regarding the issues raised in that letter that occurred during a follow-up meeting conducted on August 23, 2007.

1.1 Background

A meeting with MDNR was held on August 23, 2007, at the Modine facility in Camdenton, Missouri.[1] Discussion focused on historical investigative activities conducted at the site and viewing a video of renovation activities, including areas of floor removal, conducted in 1997. Following the video, Bob King of Modine led a site walk of the plant and exterior grounds. Discussions then focused on and addressed areas for additional investigation beneath the building floor and acceptable contaminant concentrations that could be left beneath the floor. As a result of the meeting, MDNR and Modine came to an understanding with regard to a mutually acceptable path forward. This work plan is intended to document and be consistent with that mutual understanding.

1.2 Objective

The primary objective of the investigation activities presented in this work plan is to obtain soil samples from beneath the floor at the eastern end of the former Monorail Vapor Degreaser (Solid Waste Management Unit [SWMU] 26) to assess the lateral and vertical extents of chlorinated volatile organic compounds (CVOCs) and to confirm that CVOC concentration samples historically obtained are representative of present concentrations. Historical concentrations have been no greater than 4 parts per million (ppm), a level that MDNR finds acceptable under the floor pending confirmation of the acceptability of that level or a higher level based on the results of the human health risk assessment (HHRA) being conducted as part of this work.

[1] Attendees included MDNR – Chris Kump-Mtichell, Don Van Dyke, Rich Nussbaum, Bruce Stewart; Modine – Gary Fahl, Bob King, Steve Poplawski (Bryan Cave), Dan Price (CH2M HILL).

2. Scope of Work

This section discusses the tasks to be performed and the field procedures that will be followed during the completion of borings advanced beneath the manufacturing building. A subsurface investigation beneath the building will be completed to confirm and assess the extent of CVOC contamination in subslab soil near the former Monorail Vapor Degreaser as related to contamination identified by past site investigative activities (Figure 2).

2.1 Pre-investigation Activities

Before conducting drilling activities, Modine personnel will use facility drawing and assist CH2M HILL in locating utilities and subsurface building structures in the boring vicinity. Drilling activities will not begin until utilities and subsurface structures have been clearly marked.

Since borings will be conducted in an active manufacturing facility, precautions will be made to ensure a safe working environment and minimize disturbance to plant operations. CH2M HILL will meet with Modine personnel prior to starting work to make sure the area to be drilled is free of equipment and materials. Stored material, shelving, and equipment near the drilling area will be covered with plastic sheeting to protect against dust accumulation.

As part of this work plan, the site-specific health and safety plan (HASP) will be updated and safety issues associated with site investigation activities will be included. Prior to commencing work each day, the CH2M HILL site safety coordinator will conduct a health and safety briefing to go over the HASP with the subcontractor and to discuss any health and safety issues.

2.2 Geoprobe™ Boring

A skid-mounted direct push technology (DPT) rig will be used to advance soil probes in the area near the eastern end of the former Monorail Vapor Degreaser where the horizontal boring advanced in 2006 was unable to reach due to subsurface obstructions. Up to six direct push borings will be advanced in an iterative process in order to assess the lateral extent of contamination. Presently assumed boring locations are depicted on Figure 2. These locations were selected based on CH2M HILL's conversations with MDNR during the August 23, 2007, meeting. The proposed locations are identified as borehole (BH)-1 through BH-6.

Standard field protocol (photoionization detector [PID] readings, visual observations, etc.) will be applied to determine the need for step-out borings. If PID readings are 50 units above background in BH-5, then a step-out boring south of BH-5 will be advanced to better define the southeastern extent of contamination.

Prior to advancing soil probes, the concrete floor (up to 18 inches thick) will be cored. Water or a vacuum will be used during concrete coring to help minimize airborne dust. Borings will be advanced until bedrock is encountered. Depth to bedrock is estimated to be less than 5 feet to approximately 10 feet below the concrete floor.

2.3 Subsurface Sampling

The soil column will be continually screened using a PID. Up to 12 soil samples will be collected from the depth exhibiting the highest PID reading and at the depth immediately above bedrock surface in each boring. If elevated PID readings are not observed, then a sample will be collected only from directly above bedrock.

Samples will be collected from the soil cores removed from the borehole as the probe is advanced. Samples will be collected from the portion of the core that exhibit elevated PID readings and/or visible staining using EnCore® samplers and analyzed for volatile organic compounds (VOCs) using U.S. Environmental Protection Agency (USEPA) Method 8260.

Liquid that accumulates in the boreholes within the time frame that they remain open will be collected and analyzed for VOCs using USEPA Method 8260. Water or product samples will be collected from the borehole using a bailer, placed in laboratory-supplied containers for shipment to the laboratory, and analyzed for VOCs using USEPA Method 8260. Additional product remaining in the borehole after sampling will be removed and containerized for proper future disposal. All advanced boreholes will be backfilled at the end of the day's activities. Field notes will be kept on the length of time each borehole remains open and the amount of water, if any, that accumulates in each borehole.

The laboratory will be asked to report only CVOCs, since past investigations have identified only these compounds as the constituents of concern in the investigation area. Site investigation activities will be recorded in a field logbook. Photographs also will be taken during the site investigation for documentation purposes.

2.4 Investigation-Derived Waste

Soil cores derived using the Geoprobe™ will be contained in 55-gallon drums. A waste characterization sample will be collected by CH2M HILL on behalf of the subcontracted waste hauler and sent to the laboratory specified by the waste hauler.

2.5 Site Restoration

The site will be returned to its near-original condition after completion of concrete corings, borings, and soil sampling activities. Borings will be backfilled with bentonite chips and hydrated in accordance with the Missouri Well Construction Rules. The cored concrete hole will be backfilled with 12 inches of soil and completed with 6 inches of concrete to match the existing floor surface.

Any equipment and materials moved to accommodate the drilling will be returned to its original location, and all plastic sheeting used to protect against dust will be removed.

Following the completion of work at the site, drums, trash, and other waste will be removed to the designated staging area for disposal.

2.6 RCRA Facility Investigation Report

Following completion of site investigation activities and receipt of final analytical reports from the laboratory, CH2M HILL will prepare a Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) report summarizing the drilling activities and results. Historical data generated from previous investigations at the facility (summarized in the Comprehensive Historical Summary Document [CH2M HILL 2005]) will be included in this report. These data will then undergo an HHRA to assess the potential risk posed via various exposure pathways. The report will present conclusions and recommendations, and field documentation, photographs, and laboratory reports will be included as appendixes.

3. Sample Handling and Laboratory Analysis

This section provides direction with regard to sample handling and laboratory analysis during the site investigation.

3.1 Sampling Equipment Decontamination Procedures

Equipment that may directly or indirectly contact samples will be decontaminated in a designated decontamination area. Accumulated decontamination water will be containerized, sampled, and tested prior to disposal. Based on the results, disposal will be via the onsite Modine wastewater treatment system, which discharges to the Camdenton publicly owned treatment works (POTW) or hauled offsite for proper disposal.

For hand-held sampling devices, the following procedures will be used to decontaminate the equipment. The equipment will be scrubbed with a solution of potable water and Alconox™, or equivalent laboratory-grade detergent. The equipment will then be rinsed with copious quantities of potable water followed by an American Society for Testing and Materials (ASTM) Type II reagent water.

For the probe, the following procedures will be used for decontamination between samples. The external surfaces of the sampling equipment will be washed with high-pressure hot water and if necessary, scrubbed until visible dirt, grease, oil, etc., have been removed. The sampling equipment will be rinsed with potable water.

3.2 Sample Management Procedures

During the site investigation, a consistent sample identification system will be employed to ensure uniqueness and clarity in sample names. Samples collected using a Geoprobe™ will be labeled as follows:

MO-BH-XX-XX

where: MO Modine
BH Geoprobe Borehole at the Monorail Vapor Degreaser
XX Sample Location (ex: 01-06)
XX Depth in Feet

For example, the final Geoprobe™ boring location, sample number 6, collected from the Monorail Vapor Degreaser at a depth of 5 feet would be labeled MO-BH-06-05.

Procedures to ensure the custody and integrity of the samples begin at the time of sampling and continue through transport, sample receipt, preparation, analysis and storage, data generation and reporting, and sample disposal. Records concerning the custody and condition of the samples will be maintained in field and laboratory records. Chain-of-custody records will be maintained for all field and field quality control (QC) samples. All

sample containers will be sealed in a manner that will prevent or detect tampering if it occurs.

3.3 Laboratory Analysis

Soil samples will be submitted to a contract laboratory for VOC analyses (Method 8260). Accutest Laboratories has been tentatively selected as the analytical laboratory. Soil samples collected using EnCore® samplers need to be preserved within 48 hours of collection in accordance with Method 8260. Since this work will likely be conducted on a weekend or holiday, preservation of the samples will be required. The laboratory will provide vials with methanol in which the EnCore® soil plug will be immediately transferred for preservation. The preserved sample will then be iced for shipment, resulting in a 14-day holding time prior to analysis. Samples will be shipped to the analytical laboratory on the Monday following the weekend of work.

3.4 Quality Control Samples

QC samples will be collected during the sampling portion of the site investigation to evaluate precision and bias during field activities and subsequent laboratory analysis. QC samples will consist of one field duplicate and a trip blank for each day of sampling.

3.4.1 Field Duplicates

A field duplicate sample is a second sample collected at the same location as the original sample. Duplicate samples will be collected simultaneously or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. A field duplicate will be collected at a frequency of approximately 10 percent of the total number of primary samples. CH2M HILL anticipates collecting 12 primary soil samples from the borings; therefore, two duplicate soil samples will be collected.

3.4.2 Trips Blanks

The trip blank consists of a VOC sample vial filled in the laboratory with ASTM Type II reagent grade water, transported to the sampling site, handled like an environmental sample, and returned to the laboratory for analysis. Trip blanks will not be opened in the field. Trip blanks will be prepared only when VOC samples are taken and will be analyzed only for VOC analytes. Trip blanks will be used to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures. One trip blank will accompany each cooler of samples sent to the laboratory for analysis of VOCs; therefore, CH2M HILL expects that two trip blanks will be required, one for each day of sample collection.

3.5 Quality Assurance Project Plan

To provide continuity with data collected during previous activities at the site, the quality assurance project plan (QAPP) from Dames and Moore's *RCRA Facility Investigation Work*

Plan, Modine Manufacturing Company, Camdenton, Missouri (Dames and Moore 1999) will be used for this investigation.

4. Project Schedule

The project schedule, summarized below, assumes that field activities will not be interrupted due to unforeseeable delays.

- *Notification* shall be made to MDNR 15 days prior to conducting fieldwork to allow MDNR personnel to observe sampling activities described in this work plan.
- *Mobilization* to the field will occur within 1 month of receipt of approval of this work plan from MDNR.
- *Field activities* are anticipated to be completed in 2 working days assuming that three direct push borings can be cored and advanced each day. Work is expected to be conducted over the weekend, when facility activities are reduced.
- *Analytical results* are anticipated to be available in 6 weeks after submission.
- *An RFI report* will be submitted to MDNR within 8 weeks of receipt of the analytical data from the laboratory.

Assuming there are no delays, the total time required from commencement of the field work through submittal of the RFI report will be approximately 14 weeks.

5. Project Organization

Modine will coordinate this site investigation project. Modine personnel directly involved with managing the project will include Gary Fahl, Vice President of Environmental Affairs with Modine's corporate office in Racine, Wisconsin, and Bob King, the Quality/ Environmental Manager with the Modine facility in Camdenton, Missouri. Modine has selected CH2M HILL as the consultant for the project.

The CH2M HILL project manager will be Dan Price. Mr. Price has been involved with site activities since 1995. He has approximately 19 years experience in the environmental industry and is a Registered Geologist in the State of Missouri.

The field engineer/scientist will be a qualified individual experienced in conducting oversight of DPT drilling practices. This individual will be responsible for directing the drilling subcontractors, collecting up to 12 soil samples from six sampling locations, and communicating with the onsite Modine representative and CH2M HILL project manager.

6. References

CH2M HILL. 2005. Comprehensive Historical Summary Report, Modine Manufacturing - Camdenton, Missouri. December.

CH2M HILL. 2007. 2006 Subsurface Soil Investigation, Modine Manufacturing - Camdenton, Missouri. January 26.

Dames and Moore. 1999. *RCRA Facility Investigation Work Plan, Modine Manufacturing Company, Camdenton, Missouri.*

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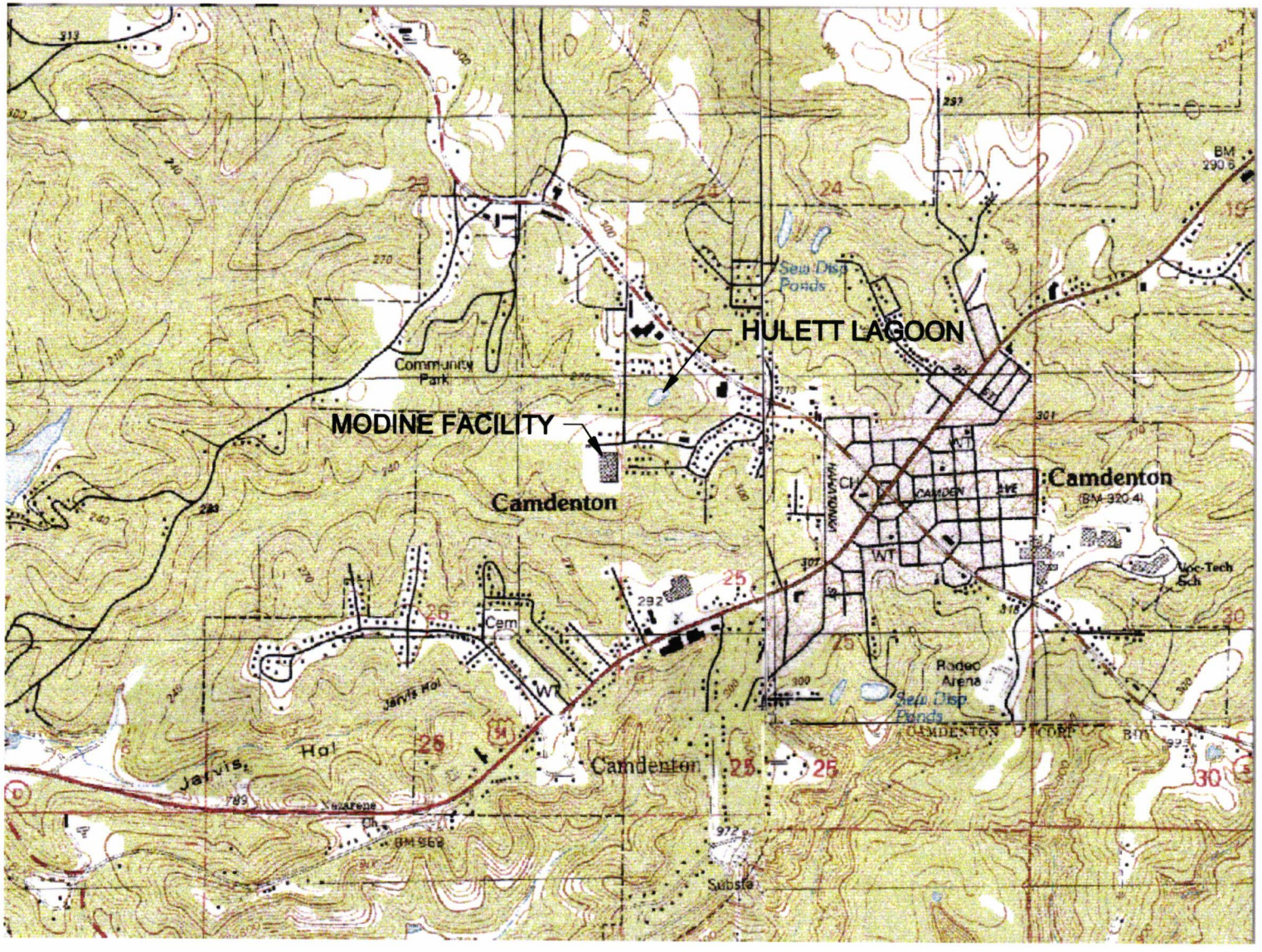

FIGURE 1
SITE LOCATION MAP
MODINE MANUFACTURING COMPANY
CAMDENTON, MISSOURI

CH2MHILL

SWMU 26
VAPOR DEGREASER
AND STILL M587

P-7
Depth=4 feet
Chemical Result
TCE (mg/kg) 4.0
Depth=4.5-5.5 feet
TCE (mg/kg) 3.4

HA-1
Depth= 2-4 feet
Chemical Result
TCE (mg/kg) 3

MO-HB-085
Depth at bedrock
Chemical Result
TCE (mg/kg) 0.69

HA-5
Depth=0-2 feet
Chemical Result
TCE (mg/kg) 0.78

BH-1, BH-2, BH-3, BH-4, BH-5, BH-6, P-1, P-2, P-3, P-4, P-5, P-6, P-8, P-9, P-10, HA-2, HA-3, HA-4, MO-HB-120, MO-HB-055

SOLVENT STORAGE TANKS

CLEANING LINE

ARGON STORAGE

NITROGEN STORAGE

PROPANE MOISTURE REMOVER

CONFERENCE ROOM

LOBBY

PRODUCTION CONTROL

ACCOUNTING

PLANT MANAGER

PERSONNEL SECRETARY

PERSONNEL MANAGER

FIRST AID

L.P. FINS KAN BAN

L.P. PRESS

BRAKE PRESS

TRAINING ROOM

RAMP

N

0 20 40 60

Scale In Feet

LEGEND

- SWMU
- BH-1 ⊙ PROPOSED BORING SAMPLING LOCATION
- MO-HB-055 ◈ HORIZONTAL BORING SAMPLING LOCATION, OCTOBER 2006
- HA-3 ⊡ LAW ENVIRONMENTAL HAND AUGER BORING, OCTOBER 1991
- P-4 ● DAMES AND MOORE PROBE, MAY 1997

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FIGURE 2

PROPOSED AND HISTORIC SAMPLING LOCATIONS AND SAMPLE RESULTS ABOVE THE SITE SPECIFIC CLEANUP LEVELS NEAR THE FORMER MONORAIL VAPOR DEGREASER AREA

MODINE MANUFACTURING COMPANY
CAMDENTON, MISSOURI

CH2MHILL